



**STEAM** Goes to the Moon

# **Moon Quiz**

**1. True or False? The Moon is Round.**

False. It is the shape of an egg but appears round because one of the smaller ends faces us (essentially an egg on it's side)

**2. The moon is moving away from us. How fast is it going?**

- a. 1.5 inches a minute**
- b. 1.5 inches a day**
- c. 1.5 inches a year**

C. 1.5 inches a year. This may not seem like much but today, the moon is about 280,000 miles from Earth; when it first formed, researchers estimate that it was just 14,000 miles away from Earth.

**3. Who was the second person to set foot on the moon?**

- a. Neil Armstrong**
- b. Luke Skywalker**
- c. Buzz Aldrin**
- d. Alan Bean**

C. Buzz Aldrin

**4. What do many astronomers think caused the moon to form?**

- A. An asteroid**
- B. A comet**
- C. The sun**
- D. A volcano**



A. An asteroid. Most astronomers think an asteroid struck the earth and the molten rock thrown into space from the impact created the moon.

**4. How long does it take for the moon to orbit  
(go around) the earth?**

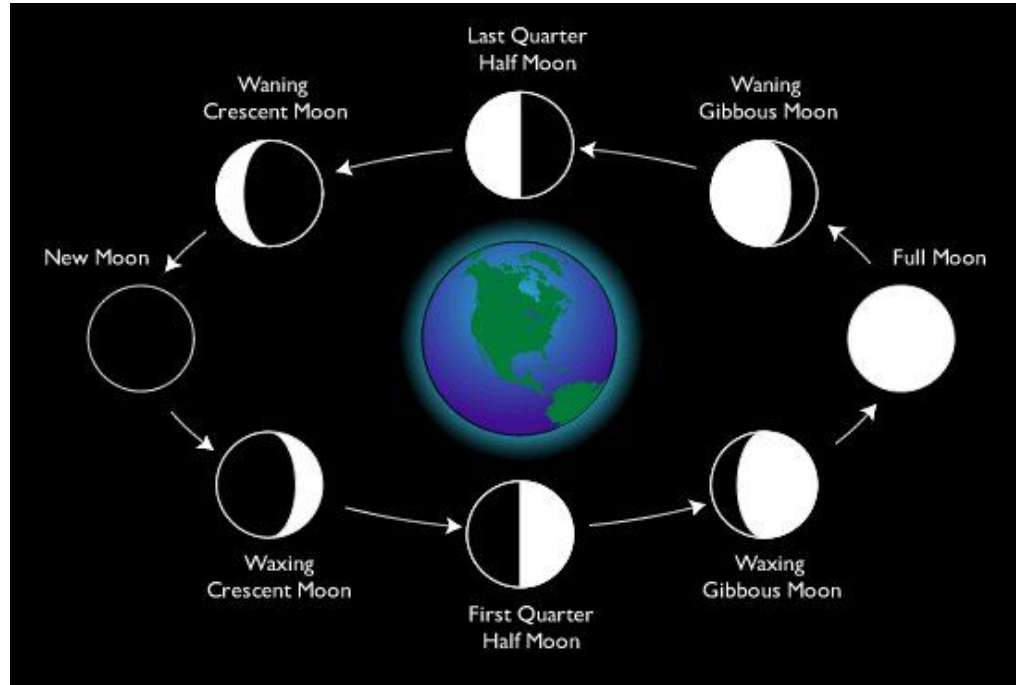
**A. One day**

**B. One month**

**C. One year**

B. One month

# Phases of the Moon



Watch [this](#) video and then try acting out the phases of the moon.

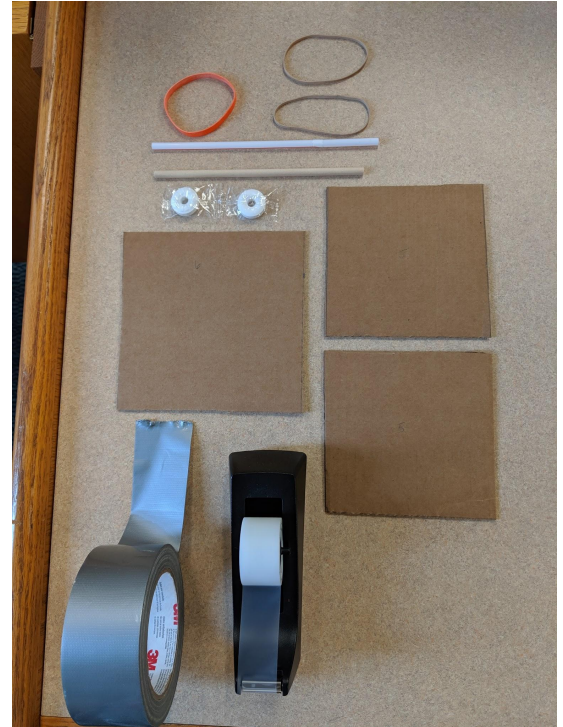


# Moon Rover Challenge

We challenge you to build a rubber band-powered rover that can scramble across the floor.

## Materials (per rover)

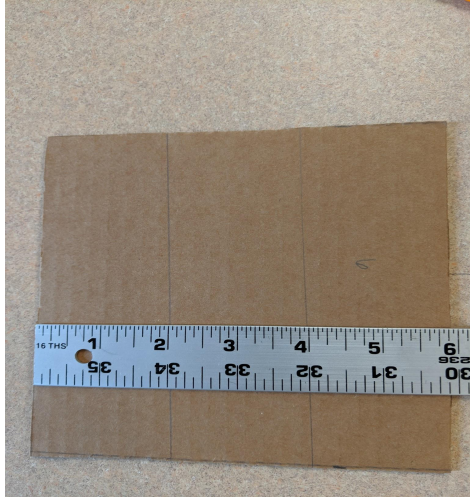
- 1 corrugated cardboard body (6-inch square)
- 2 corrugated cardboard wheels (5-inch square)
- 1 wooden dowel (7-inch)
- 1 thick rubber band
- 2 skinny rubber bands (linked together to form chain)
- 2 round candies (hard, white mint ones with a hole in the middle)
- (or you can substitute additional cardboard for front wheels)
- 1 plastic drinking straw (cut to 6 inches)
- tape
- ruler



# Build

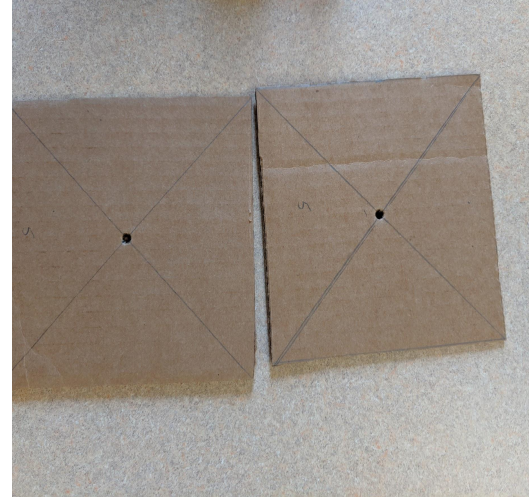
1. First, you make the body.

Measure in 2 inches on each side of the 6-inch square and draw lines. Make sure the line falls along (not across) the corrugation (the tubes inside the piece of cardboard). Along the lines, fold the cardboard into thirds.



2. Then, make the front wheels.

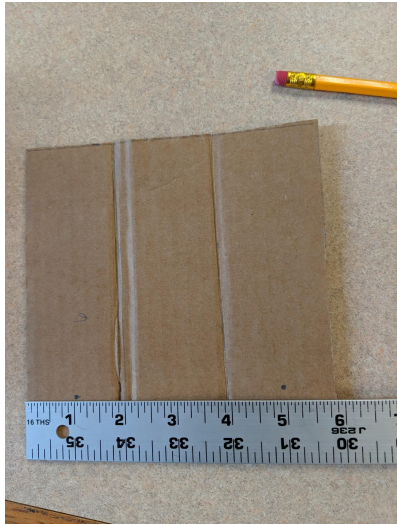
On the two 5-inch cardboard squares, draw diagonal lines from corner to corner. Poke a small hole in the center, where the lines cross.



# Build

## 3. Create the axle.

On the body, measure in 1-inch and up 1-inch on each outer side and mark; poke a hole for the axle. Make sure the hole is big enough for the dowel to spin freely.



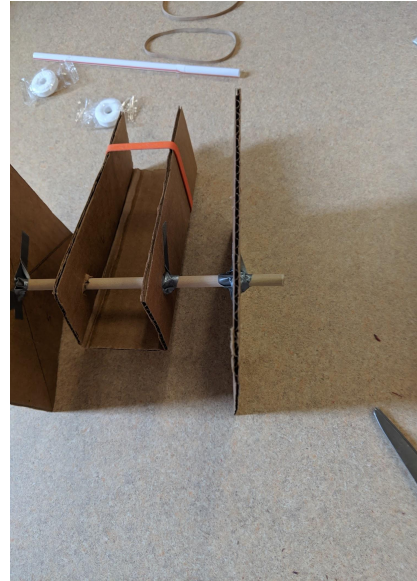
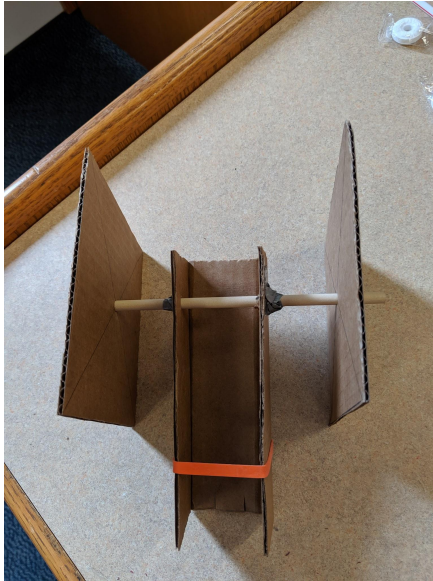
Push the dowel through the body's axle holes. Make 2 small slits in the center body, opposite the dowel end. Slide on large rubber band to keep the sides upright.



# Build

4. Now attach the front wheels.

Push a wheel onto each end and secure with tape. Note: Do not tape the dowel to the body; these photos were taken at our first attempt.

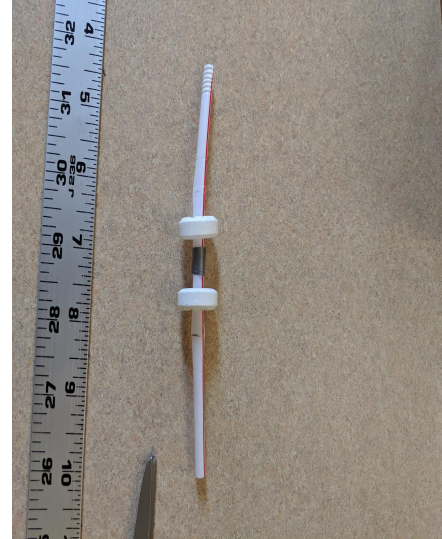
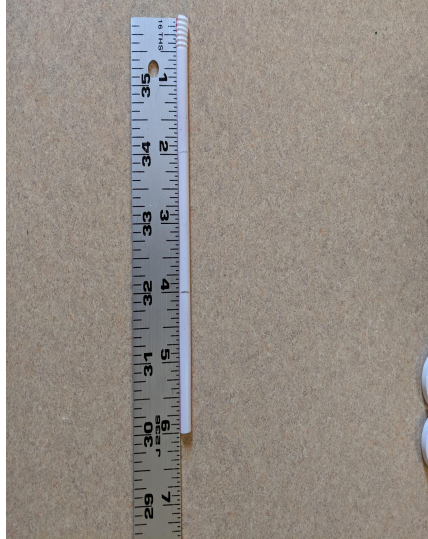


# Build

5. Next, make the rear wheels.

Cut the straw to 6 inches. Then measure in 2 inches on each side and mark.

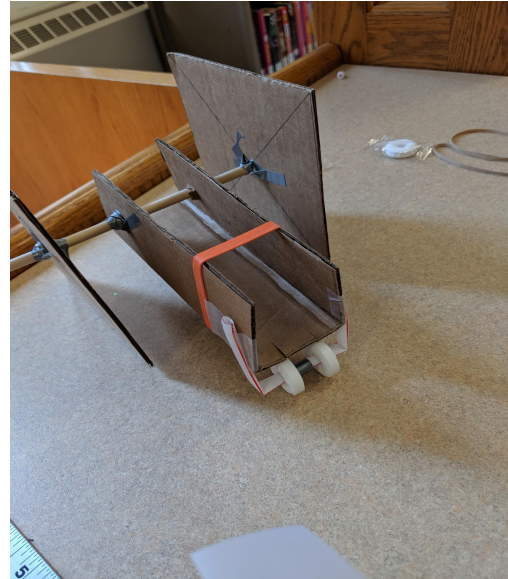
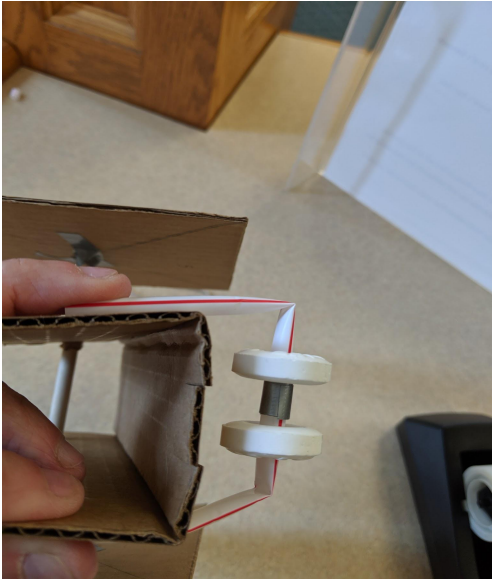
Wind a piece of tape around the center of the straw, then slide the candies onto each end of the straw. Bend the straw at the marks.



# Build

## 6. Attach rear wheels.

Tape the straw to the outer sides of the body. Make sure to leave a bit of space so that the wheels do not rub against the underside of the body.

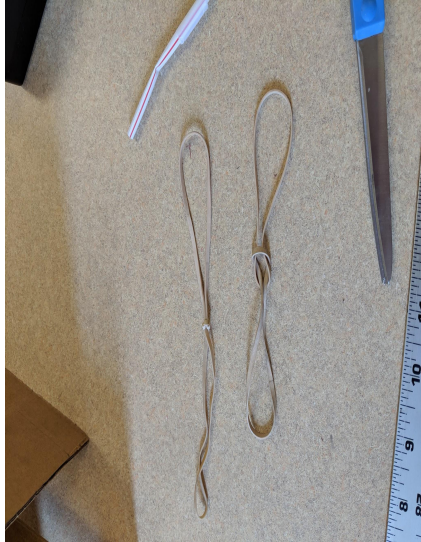
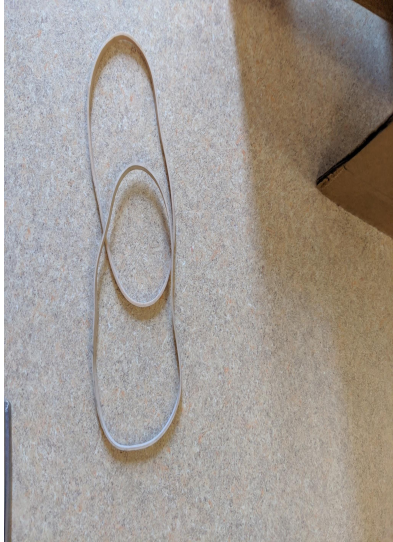




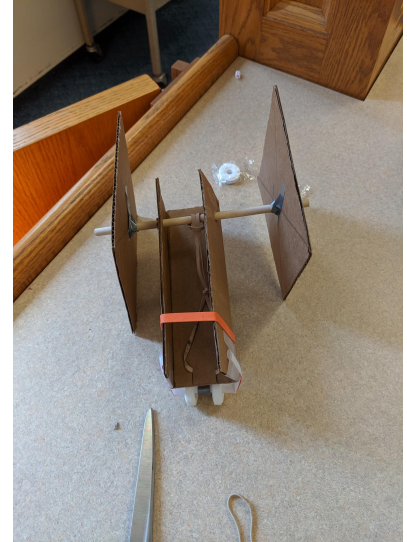
# Build

7. Finally, attach the rubber band.

Make a chain by linking 2 smaller rubber bands together.



Loop one end of the rubber band chain around the dowel. Slide the free end of the rubber band chain into the slits in the body.



# Test, Evaluate, and Redesign

Test your rover. Wind up the wheels, set the rover down, and let it go. Did everything work? Can you make it go farther? Redesign and make changes, if necessary.

Tips:

- If the wheels don't turn feely, make sure that the axle holes are big enough for the dowel to turn.
- If the rover doesn't go far—Wind up the wheels more. Try wheels of different sizes or shape.
- If the wheels spin out—Add weight above the square wheels; put more wheels on the dowel; or cut open a rubber band and use only a single strand of elastic.
- If the rover won't travel in a straight line—Check that the dowel is straight and the front wheels are the same size.

# Did You Know?

## **Custom Wheels**

The moon doesn't have an atmosphere—there's no air on the moon! Air-filled tires like the ones on a bike or a car would explode on the moon. So, how do the rovers crawl around? Engineers designed a tire that works perfectly when it is used on the moon. It's made of thin bands of springy metal. This keeps the rover lightweight, gives it good traction, and lets it work at any temperature on the moon. Plus, this material flexes when it hits a rock, and it doesn't need to be pumped up. All these things make it dependable. And dependability is important because there's no roadside service when you're on the moon, 250,000 miles (400,000 km) from home!